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hand, a study of the symmetrical profiles of the reef-lagoon structures here considered has furnished one more direct indication that the existing coral reefs are new upgrowths on platforms, which have been formed before, and independently of, the reefs. The volumes of the reefs suggest that these began to grow not many thousands of years ago. The platforms, on which the reef crowns rest, seem to have been finally smoothed, and prepared as foundations, during the Glacial period. In any case, the submarine topography of each reef-platform structure *as a whole* and the elementary principles of oceanography together declare against the assumption that the forms and spatial relations of atoll and barrier reefs are due to the sinking of the earth's crust.

A NEW THERMOMETER SCALE

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In the *Physical Review* (Vol. VI, No. 6, December, 1915), I urged the importance of adopting without further delay, in aerophysics, units that have a scientific basis. At Blue Hill Observatory for the past two years we have published summaries of air pressure also vapor pressure in *kilobars* or force units, temperature in degrees absolute centigrade, and wind velocities in meters per second. Wind direction is given in degrees, starting from the West; rainfall in millimeters and evaporation in force units.

The British Meteorological Office, under the progressive leadership of Sir Napier Shaw has published since 1915 results in similar units. Unfortunately the European definition of the megadyne atmosphere, the *bar* so-called, is misleading, a more scientific definition being *megabar*. The use of the smaller unit does away with the inconsistency of defining a millibar as 1000 bars, a self-evident contradiction, and allows us to define the bar, the basic unit as the force which would impart to a gram an acceleration of 1 cm. per second per second. A *kilobar* or 1000 bars becomes then the natural and consistent unit for all measurements of pressure in force units.

With regard to temperature, a concept all important in atmospheric, it is regrettable that we have no available method of expressing gain or loss of heat in terms of molecular motion. The ordinary mercurial thermometer is certainly a crude instrument and so far as thermometer scales go, there has been no real improvement since Linnaeus reversed the order of the Celsius marking. It will be generally conceded that

the Fahrenheit scale has now outlived its usefulness. Some meteorologists however still oppose the use of the centigrade scale and also the absolute, on the ground that the scale division even when read to tenths is too large for meteorological purposes.

To meet this objection and for other reasons, I suggest a new scale to be known as the New Absolute, or briefly, New. The zero of the new scale will be the same as that of the absolute, approximately 491° below freezing on the Fahrenheit and 273° below on the centigrade. The other fiducial point is the temperature of melting ice at a pressure of 1000 kilobars and is marked 1000. (The degree sign is omitted as it has been decided to reserve this symbol for angular measure.) The scale divisions are thus 0.366 of the centigrade, even smaller than the Fahrenheit and permit of any desired refinement of reading. Some other advantages of the new scale are:

1. The abolition of all minus signs. In upper air work temperatures are far below freezing. At a height of 10 kilometers readings may be lower than those recorded by Scott in the Antarctic. Given such a reading as -66.0°F. , or -54.0°C or 219.0°A. ; on the new scale this is read 800. Or again, some of the surface winter temperatures are confusing unless the minus sign is emphasized. The new scale has an advantage here as when we write 900 in place of -17.5°F. or -27.0°C or even 245.7°A.

2. The grand division of *warm* and *cold* as experienced by the general public in the every-day affairs of life is characteristically marked. Warm is any reading above 1100; cold is any reading below 1000.

3. In published tabular work there is a saving in typographical composition. There is also a saving of time in computation and increased accuracy.

4. But of even greater importance is the fact that the new scale makes for clearer conceptions of the nature and magnitude of temperature changes. It is astonishing how indefinite and vague are the ideas of most students regarding heat and the significance of a given temperature. And furthermore it is a difficult matter with the present scales to present clearly to the student a picture of the process of energy transfer available as heat.

5. The new scale starting as it does from the temperature of no molecular motion and laying stress upon the temperature of change of form of the most familiar substance, water to ice, has it would seem to me, a certain educational value, which the Fahrenheit and centigrade certainly do not have and which the absolute scale owing to the awkwardness of the fraction $1/273$ loses.

6. Finally in problems of thermodynamics, there would seem to be no valid objection to its use. In the characteristic equation for a pure gas, the product of the new reading and the gas constant give as before a measure of the kinetic energy of translation of the molecules. Similarly in Avogadro's law, we have an even more definite conception of the temperature function; and also in the Stefan-Boltzmann law of black body radiation.

ON THE IMMUNITY COLORATION OF SOME NUDIBRANCHS

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Certain large nudibranchs, notably species of *Chromodoris*, exhibit a combination of brilliancy of pigment pattern and boldness of habits sharply distinguishing them from related nudibranchs which appear to be efficiently protected by their concealing coloration and behavior. It has long been suspected that the strikingly colored chromodorids achieve an immunity from predatory enemies by virtue of some distasteful quality, according to the classical conception of 'warning coloration.' The experimental evidence for this belief, as presented by Herdman and by Crossland, has remained, however, very fragmentary and is indeed far from carrying conviction.

For several years I have been interested in the pigmentation of the large Bermudian *Chromodoris zebra* Heilprin, mainly because its blue integumentary pigment is available as an intracellular indicator of acidity. On the basis of field observations, continuous throughout the year, I was led to undertake a series of experiments intended to throw light upon the possible biological meaning of this animal's coloration. The outcome seems reasonably conclusive, and it leads to the rejection of the idea that a warning significance attaches to the pigmentation of *Chromodoris*. By inference, one is inclined to suspect that more complete study will reveal analogous conditions with reference to other brightly colored nudibranchs.

The pigment pattern of *C. zebra* is, in brief, an irregular streaking of yellow or orange upon a field of blue. The foot, the ventral surface of the mantle, and various less conspicuous parts are of a pure blue. The animals occur at various stations, ranging in depth from about 10 fathoms to the surface of the water. They are most abundant, though, in quite shallow water, except during a portion of the summer and immediately after severe storms at other seasons. Their color-

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